

**UNITED STATES DEPARTMENT OF COMMERCE****Patent and Trademark Office**Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/481,803	08/31/98	TAVKHELIDZE	A

Borealis Technical Limited  
203545 NW Skyline Blvd  
North Plains OR 97133-9204

PMUCL/DR/14

EXAMINER

TAMAI, K

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 03/14/01

Please find below and/or attached an Office communication concerning this application or proceeding.

**Commissioner of Patents and Trademarks**

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/481,803	TAVKHELIDZE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Tamai IE Karl	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

**Status**

- 1) Responsive to communication(s) filed on 18 December 2000.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 19, 20, and 38-42 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-5, 7-18 and 21-37 is/are rejected.
- 7) Claim(s) 6 is/are objected to.
- 8) Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 31 August 1998 is/are objected to by the Examiner.
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved.
- 12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
  - a) All
  - b) Some \*
  - c) None of the CERTIFIED copies of the priority documents have been:
    1. received.
    2. received in Application No. (Series Code / Serial Number) \_\_\_\_\_ .
    3. received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

**Attachment(s)**

14) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	17) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
15) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	18) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
16) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____	19) <input type="checkbox"/> Other: _____

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## DETAILED ACTION

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-18 and 21-37 in Paper No. 10 is acknowledged.

### ***Drawings***

2. The drawings are objected to because the drawings are not numbered consecutively, specifically there are no figures 3 or 4. Appropriate correction is required. The "Brief Description of the Drawings" and the references to the drawings in the "Detailed Description of the Invention" should be amended to be consistent with the newly numbered drawings.

### ***Specification***

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
4. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification. Appropriate correction is required. Such as removing the list of reference numbers of pages 18, 19, and 20.

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***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 18 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 18-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The specification does not enable or contain a full, clear, concise, and exact written description of a conversion device that will generate an AC current.

***Claim Rejections - 35 USC § 101***

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 18-22 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. The disclosed invention will not generate

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Alternating current my oscillation of the manipulation means. The oscillation of the electrodes will only effect the amplitude of the generated voltage, but will not create an AC current.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

10. Claims 1-2 and 7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kennel(US 5410166). Kennel teaches a thermal conversion device having a source of electron tunneling(voltage source) connected to the emitter which when pulsed, produced an electron tunnel to the anode 104, where the anode can be manipulated at 108. Kennel teaches the emitter and collector connected a circuit as a thermionic generator or switch. The thermionic generator being in a housing 102 is flexible to allow the movement of the manipulating means and the anode 104. It is inherent that the manipulator 108 includes some form of means for assessing the electrode distance.

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11. Claims 1, 2, 4, 7, 23, and 24 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hatsopoulos and Gyftopoulos(H&G). H&G teach themionic diode having a flat emitter and collector. H&G teach a manipulator(spacing adjustment mechanism) to control the relative spacing of the electrodes. It is inherent that a power converter is connected to an electrical load. H&G teaches thermionic converter in a vacuum housing which is flexible to allow the movement of the electrodes. H&G shows the electrode adjustment means which is activated by a human and which inherently can determine the spacing of the electrodes.

12. Claims 1, 2, 8-16, 23, 24, and 27 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by DiMatteo(US 6,084,173). DiMatteo teaches an energy converter having an emitter 1 connected to a heat source and a collector 2 connected to a cool source, which is connected to a circuit as photovoltaic(sunlight) generator and is inherently positioned in a flexible housing which allows the adjustment of the electrodes. DiMatteo teaches piezoelectric actuators to adjust the position of the electrodes which inherently includes a control means for the electrodes.

13. Claims 23 and 28 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Rason et al.(Rason)(US 3,843,896). Rason teaches a diode with flat matching surfaces between the electrodes. Rason teaches the emitter and collector

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made from different materials, which inherently have different coefficients of thermal expansion.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over H&G, Kennel, or DiMatteo, in further view of Rason et al.(Rason)(US 3,843,896). H&G, Kennel, and DiMatteo, each individually teach every aspect of the invention except the housing being thermally conductive. Rason teaches a conductive housing to allow heat to pass in and out of the converter. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the energy converter of H&G, Kennel, or DiMatteo with the conductive housing of Rason to allow heat pass into the energy convert to generate electricity.

16. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over H&G, Kennel, or DiMatteo, in further view of Yasuda(US 5,487,790). H&G, Kennel, and DiMatteo, each individually teach every aspect of the invention except the metal powder on the collector electrode. Yasuda teaches a metal powder on the collector electrode. It would have been obvious to a person of ordinary skill in the art at the time of the

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invention to construct the energy converter of H&G, Kennel, or DiMatteo with the metal powder on the collector electrodes because Yasuda teaches to help efficiently convert solar heat to electricity.

17. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over DiMatteo, in further view of Cox(US 6,6064,137). DiMatteo teaches every aspect of the invention except a voltage source to operate the device as a heat pump. Cox teaches it is known to provide a voltage source 23 to a thermionic converter to operate the device as a heat pump. It would have been obvious to a person skilled in the art at the time of the invention to construct the converter of DiMatteo with the voltage source of Cox to operate the device as a heat pump.

18. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiMatteo or H&G. DiMatteo and H&G, each individually teach every aspect of the invention except the collector and emitter positioned within 200 or 100 angstroms. It would have been obvious to a person skilled in the art at the time of the invention to construct the diode of DiMatteo or H&G with the electrode spacing of 200 or 100 angstroms to provide a small air gap to reduce thermionic leakage around the collector.

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19. Claims 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rason, in further view of Richards(US 4,281,280) and Edelson(US 5,874,039). Rason teaches every aspect of the invention except the collector being aluminum and emitter being titanium with a difference of thermal expansion being 4-1. Richards teaches aluminum is a known anode material. Edelson teaches titanium is a known emitter material. It would have been obvious to a person skilled in the art at the time of the invention to construct the energy converter of Rason with the aluminum anode of Richards and the titanium emitter of Edelson because mere selection of known parameters is within the ordinary skill in the art and because Richards and Edelson teaches the materials are sufficient for electrode structures in thermionic converters.

20. Claims 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rason, in further view of Cox(US 6,064,137). Rason teaches every aspect of the invention except the method of forming the converter through layers with a non-destructive removal of a middle layer. Cox teaches a thermionic converter formed with layers having a non-destructive removal of a middle layer. It would have been obvious to a person skilled in the art at the time of the invention to construct the energy converter of Rason by the method of Cox to provide precise positioning of the electrodes.

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21. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rason and Cox. Rason and Cox teach every aspect of the invention except positioning the electrodes within 200 or 100 angstroms. It would have been obvious to a person skilled in the art at the time of the invention to construct the diode of Rason and Cox with the electrode spacing of 200 or 100 angstroms to provide and small air gap to reduce thermionic leakage around the collector.

22. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rason and Cox. Rason and Cox teach every aspect of the invention except piezoelectric positioning the electrodes. DiMatteo teaches piezoelectric positioners to adjust the spacing of the electrodes. It would have been obvious to a person skilled in the art at the time of the invention to construct the diode of Rason and Cox with the actuators of DiMatteo to make fine adjustments to the electrode spacing.

***Allowable Subject Matter***

23. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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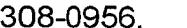
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24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl I.E. Tamai whose telephone number is (703) 305-7066.

The examiner can be normally contacted on Monday through Friday from 8:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Nestor Ramirez, can be reached at (703)308-1371. The facsimile number for the Group is (703)305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is

(703) 308-0956.   
KARL TAMAI  
PRIMARY EXAMINER  
Karl I Tamai  
PRIMARY PATENT EXAMINER  
March 10, 2001